



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,851	07/10/2003	Tomohiro Okumura	2003_0932A	9994
513	7590	05/26/2006		
WENDEROTH, LIND & PONACK, L.L.P. 2033 K STREET N. W. SUITE 800 WASHINGTON, DC 20006-1021				
			EXAMINER	
			ALEJANDRO MULERO, LUZ L	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/615,851	<b>Applicant(s)</b> OKUMURA ET AL.	
	<b>Examiner</b> Luz L. Alejandro	<b>Art Unit</b> 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-10, 12 and 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-10, 12-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 5-9, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldwin, Jr. et al., U.S. Patent 6,280,563 in view of Tobe et al., U.S. Patent 5,891,349.

Baldwin, Jr. et al. shows the invention as claimed including an apparatus for plasma doping, comprising: a vacuum container 12 defining a chamber therein, the container having a portion made of a dielectric material such as quartz (see col. 7-lines 2-3) and bearing an impurity 56 to be doped in a substrate 11 provided in the chamber; and a plasma source (for example, 40) operable to generate a plasma in the chamber

Art Unit: 1763

by forming an electric field through the portion of the container, so as to cause ion in the plasma to impinge against the portion of the container to draw the impurity out of the portion of the container into the chamber, wherein the impurity can comprise aluminum and wherein the plasma source comprises: a coil or antenna 36; a power source operable to apply a high frequency power to a first end of the coil or antenna so as to generate the plasma in the chamber, wherein the power source comprises a first power supply 40 operable to supply a first power with a first frequency and a second power supply 48 operable to supply a second power with a second frequency, and wherein a capacitor 39 or note that matching network contains variable reactances or capacitors (see col. 7-lines 35-39, and col. 11-lines 25-30 and fig. 1 and its description).

Baldwin, Jr. et al. does not expressly disclose wherein the second frequency of the second power is less than one tenth of the first frequency of the first power and wherein an impedance of the coil or antenna with respect to the first power with the first frequency is at least two times more than the impedance of the capacitor coupled to the coil or the antenna, and wherein an impedance of the coil or antenna with respect to the first power with the first frequency is at least one fifth of the impedance of the capacitor coupled to the coil or the antenna. Tobe et al. discloses using a radio frequency power source 52 to be coupled to an antenna with frequencies ranging from 10 kHz to 100 MHz (see col. 9-lines 16-20). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Baldwin, Jr. et al. so as to provide radio frequency power supplies having usable frequencies in the range of Tobe et al. because such power supplies are shown

Art Unit: 1763

to be suitable for supplying power to antennas in an inductively coupled apparatus.

Furthermore, with respect to the particular claimed relative frequencies and impedances, the limitations are directed to the method instead of the apparatus.

However, since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Baldwin, Jr. et al. modified by Tobe et al. is capable of producing the claimed relative frequencies and impedances.

With respect to claims 2 and 9, note that in Baldwin, Jr. et al. the impurity 56 is deposited on a surface of the portion of the container.

Concerning claims 5 and 12, note that a second end of the coil or antenna in Baldwin, Jr. et al. is grounded through node 38.

With respect to claims 6 and 13, note in Baldwin, Jr. et al. the presence of a biasing electrode 44 provided between the coil or antenna and the portion of the container and a second power source 57 to apply a second high frequency power to the biasing electrode.

Furthermore, with respect to claim 7, note that in Baldwin, Jr. et al. a device can be formed by the apparatus of fig. 1.

Art Unit: 1763

Claims 1-3, 5-10, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al., U.S. Patent 6,624,084 in view of Baldwin, Jr. et al., U.S. Patent 6,280,563 and Tobe et al., U.S. Patent 5,891,349.

Maeda et al. shows the invention as claimed including an apparatus for plasma doping, comprising: a vacuum container defining a chamber therein, the container having a portion made of a dielectric material such as quartz (see col. 9-lines 2-3) and bearing an impurity to be doped in a substrate provided in the chamber (see conductive member of fig. 1B which can be a material such as aluminum); and a plasma source 11 operable to generate a plasma in the chamber by forming an electric field through the portion of the container, so as to inherently cause ion in the plasma to impinge against the portion of the container to draw the impurity out of the portion of the container into the chamber, wherein the impurity can comprise aluminum (see fig. 1B and 3 and their description).

Maeda et al. is applied as above but does not expressly disclose the claimed power source and a biasing electrode provided between the coil and the antenna. Baldwin, Jr. et al. discloses a power source applied to a coil wherein the power source comprises a first power supply 40 operable to supply a first power with a first frequency and a second power supply 48 operable to supply a second power with a second frequency. Furthermore, Baldwin, Jr. et al. also discloses a biasing electrode 44 provided between the coil or antenna and the portion of the container (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Maeda et

Art Unit: 1763

al. so as to include the power source and biasing electrode of Baldwin, Jr. et al. because such a power source allows for greater control over the process conducted within the apparatus and the presence of the biasing electrode allows for effective inductive coupling of the plasma in the processing chamber.

Furthermore, Baldwin, Jr. et al. does not expressly disclose wherein the second frequency of the second power is less than one tenth of the first frequency of the first power and wherein an impedance of the coil or antenna with respect to the first power with the first frequency is at least two times more than the impedance of the capacitor coupled to the coil or the antenna, and wherein an impedance of the coil or antenna with respect to the first power with the first frequency is at least one fifth of the impedance of the capacitor coupled to the coil or the antenna. Tobe et al. discloses using a radio frequency power source 52 to be coupled to an antenna with frequencies ranging from 10 kHz to 100 MHz (see col. 9-lines 16-20). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Maeda et al. modified by Baldwin, Jr. et al. so as to provide radio frequency power supplies having usable frequencies in the range of Tobe et al. because such power supplies are shown to be suitable for supplying power to antennas in an inductively coupled apparatus. Furthermore, with respect to the particular claimed relative frequencies and impedances, the limitations are directed to the method instead of the apparatus. However, since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are

Art Unit: 1763

viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Maeda et al. modified by Baldwin, Jr. et al. and Tobe et al. is capable of producing the claimed relative frequencies and impedances.

Concerning claims 2-3 and 9-10, note that the impurity in the apparatus of Maeda et al. modified by Baldwin, Jr. et al. and Tobe et al. is deposited on a surface of the portion of the container and is provided inside the portion of the container.

Furthermore, with respect to claim 7, note that a device can be formed by the apparatus of Maeda et al. modified by Baldwin, Jr. et al. and Tobe et al..

### ***Response to Arguments***

Applicant's arguments filed 3/13/06 have been fully considered but they are not persuasive. Applicant argues that the combination of Baldwin, Jr. et al. and Tobe et al. is improper because the combination of references do not teach having two RF power sources at the claimed frequencies relative to one another. However, the examiner respectfully submits that the combination of Baldwin, Jr. et al. and Tobe et al. does teach having two RF power sources having the capability of having the claimed frequencies, which is what is required since the claims are directed to the apparatus and not the process. Concerning applicant's argument that the claimed impedances are also not shown, the examiner respectfully submits that the apparatus is capable of having the claimed impedances particularly because the capacitors in the matching circuits are adjustable. Furthermore, with respect to the particular claimed relative



Art Unit: 1763

frequencies and impedances, as stated in the previous and above rejections, the limitations are directed to the method instead of the apparatus and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Baldwin, Jr. et al. modified by Tobe et al. and the apparatus of Maeda et al. modified by Baldwin, Jr. et al. and Tobe et al. is capable of producing the claimed relative frequencies and impedances.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

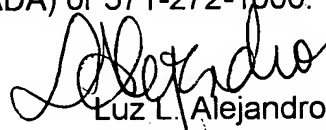
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Art Unit: 1763

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Luz L. Alejandro  
Primary Examiner  
Art Unit 1763

May 24, 2006